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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/628,781	07/28/2003	Christopher John Chuter	HESI.105897	4513

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EXAMINER

CASCHERA, ANTONIO A

ART UNIT	PAPER NUMBER
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2628

DATE MAILED: 10/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/628,781	Applicant(s) CHUTER, CHRISTOPHER JOHN	
	Examiner Antonio A. Caschera	Art Unit 2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 June 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-22, 24-43, 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kilgard, "A Practical and Robust Bump-mapping Techniques for Today's GPUs," (July 5, 2000, pp. 1-39, NVIDIA Corp.) in view of Rice (U.S. Patent 4,467,461).

In reference to claims 1, 24-27, 45 and 46, Kilgard discloses a bump-mapping technique suited for the capabilities of today's graphic processor units (see abstract, pg 1) which renders objects represented by polygonal models, these models inherently providing normal and tangent vectors at each of its' vertices (see section 5.1, 1st paragraph, pg. 17). Kilgard further discloses the vectors produced from parametric representations modeling the object (see section 5.1, 2nd paragraph, pg. 17). Kilgard discloses the normal map being made up of range-compressed normal vectors representing the perturbation of object surfaces using 2D textures (see section 5.3, 1st paragraph, pg. 18). Note, the Office interprets the map of Kilgard to inherently comprise of vertices since the maps comprise of vector data. Further note, the Office interprets that an "attribute" is represented in the texture data of Kilgard. Kilgard further discloses transforming the normal map into tangent space represented by the vectors Tn, Nn and Bn (see section 5.1, 4th-6th paragraphs, pg. 17, matrix with these vectors comprised within). Kilgard also discloses

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creating a light vector in tangent space using the above mentioned matrix along with a calculating light vector in object space (see section 5.1, 5th-6th paragraphs, pg. 17). Kilgard discloses calculating bump-mapped ambient illumination based upon an equation that utilizes a normalized vector (N') (see section 2.4, 2.4.1, pgs. 4-5). Kilgard lastly discloses blending both the ambient illumination component and a diffuse illumination component to form an object's decal (see section 5.4, pg. 21, 2nd full paragraph and Figure 14). Although Kilgard discloses the normal map formed of vectors and 2D textures, these textures representing some sort of object "attribute", as interpreted by the Office, Kilgard does not explicitly disclose selecting a first attribute and a second attribute from multiple attributes. Rice discloses interactively displaying and analyzing geophysical data (see column 1, lines 7-11). Rice discloses selecting parametric attributes of geophysical data, e.g. seismic data, exploration and delineation ore body data and the like, to exhibit the selected data property in variable pixel coverage and intensity on a display (see column 1, lines 35-47). Rice particularly discloses the selected attributes ranging from amplitude, frequency, envelope (energy), phase, instantaneous velocity, etc. (see column 3, lines 14-23). Note, in lines 14-23 of column 3 of Rice, multiple attributes are selected for output to display and therefore inherently, first and second attributes are selected from multiple attributes. Rice further discloses the selected seismic attribute "substantially" undistinguishable in its natural environment, when displayed in 3D form (see Figure 14). It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the selecting, analyzing and displaying of geophysical data attributes of Rice with the computer graphics bump-mapping techniques of Kilgard in order to convey multiple pieces of information to the user in a single display screen by combining different attributes together and represented

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graphically using different effects, therefore creating an increase in yielded information to a user (see column 1, lines 47-54 of Rice). Further, Kilgard's techniques of bump-mapping are often associated with the displaying of geographic data which Rice is clearly directed towards. Also note in reference to claim 27, Rice discloses utilizing a computer to perform the rendering of graphical data, along with numerous memories/storage devices for storing data and also programming instructions (see column 3, lines 33-53 and Figure 4) (see *Response to Arguments* below).

In reference to claims 2 and 28, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Rice particularly discloses the selected attributes ranging from amplitude, frequency, envelope (energy), phase, instantaneous velocity, etc. (see column 3, lines 14-23). Note, in lines 14-23 of column 3 of Rice, multiple attributes are selected for output to display and therefore inherently combination of attributes are selected from multiple attributes (see *Response to Arguments* below).

In reference to claims 3 and 29, Kilgard and Rice disclose all of the claim limitations as applied to claims 2 and 28 respectively above. Rice particularly discloses the selected attributes ranging from amplitude, frequency, envelope (energy), phase, instantaneous velocity, etc. (see column 3, lines 14-23). Note, in lines 14-23 of column 3 of Rice, multiple attributes are selected for output to display and therefore inherently, combination of attributes are selected from multiple attributes and shown together which is interpreted functionally equivalent to Applicant's "hybrid" attribute (see #66 of Figure 3 of Rice) (see *Response to Arguments* below).

In reference to claims 4 and 30, Kilgard and Rice disclose all of the claim limitations as applied to claims 2 and 28 respectively above. Rice discloses selecting parametric attributes of

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geophysical data, e.g. seismic data, exploration and delineation ore body data and the like, to exhibit the selected data property in variable pixel coverage and intensity on a display (see column 1, lines 35-47). Note, in lines 14-23 of column 3 of Rice, multiple attributes are selected for output to display and therefore inherently, combination of attributes are selected from multiple attributes and shown together which is interpreted functionally equivalent to Applicant's "hybrid" attribute (see #66 of Figure 3 of Rice) (see *Response to Arguments* below).

In reference to claims 5 and 31, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Although Kilgard discloses using a first texture attribute in creating the normal map and also combined with lighting components, neither Kilgard nor Rice explicitly disclose utilizing a first attribute in combination with the lighting components and a second attribute to create a normal map. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to combine the multiple selected attributes of Rice into both the lighting and normal map creation of Kilgard. Applicant has not disclosed that combining a first attribute with a lighting component and a second attribute with normal map creation provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with the texture attribute incorporation of lighting component and normal maps because utilizing multiple attributes for further calculations solely provides a greater detailed output, in the case of Kilgard and Rice, and provides no immediate criticality to the application at hand. Further support for such an interpretation, is found when comparing claim 5 to claim 6, particularly, claim 6 seems to suggest an alternate configuration of utilizing only a first attribute to combine with lighting components and normal map creation. Therefore,

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it would have been obvious to one of ordinary skill in this art to modify Kilgard and Rice to obtain the invention as specified in claims 5 and 31.

In reference to claims 6 and 32, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Kilgard discloses the normal map being made up of range-compressed normal vectors representing the perturbation of object surfaces using 2D textures (see section 5.3, 1st paragraph, pg. 18). Rice particularly discloses the selected attributes ranging from amplitude, frequency, envelope (energy), phase, instantaneous velocity, etc. (see column 3, lines 14-23). Note, in lines 14-23 of column 3 of Rice, multiple attributes are selected for output to display and therefore inherently combination of attributes are selected from multiple attributes.

In reference to claims 7-10 and 33-36, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Since Rice discloses selecting multiple attributes and showing them together (see column 3, lines 14-23), the Office interprets that claims 7 and 33 are inherent in the combination of the limitations disclosed by Kilgard and Rice. These claims simply reiterate the steps taken in independent claims 1 and 27 which therefore suggests that another attribute is being shown to the user. Such a limitation of showing multiple features to the user at once is present in Rice and further is simply a repetition of already performed steps as disclosed by Kilgard and Rice. Therefore, the Office interprets that it would have been obvious to one of ordinary skill in the art at the time the invention was made to repeat the steps of Kilgard and Rice to show more data to the user in order to provide a more detailed and therefore easier to compare results, display of data to a user data analyzer.

In reference to claims 11-13 and 37, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Rice discloses displaying different representations of the selected seismic attribute data (see Figures 10-15). Rice further discloses these representations to comprise of different planar surfaces (see Figures 10-15).

In reference to claims 14 and 38, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Kilgard further discloses the normal map comprising of three-dimensional coordinates (see section 5.1, 5th-6th paragraphs, ph. 17 and pg. 10, 2nd paragraph).

In reference to claims 15 and 39, Kilgard and Rice disclose all of the claim limitations as applied to claims 14 and 38 respectively above. Kilgard discloses the normal map being made up of range-compressed normal vectors representing the perturbation of object surfaces using 2D textures (see section 5.3, 1st paragraph, pg. 18). Kilgard also discloses the vectors derived using a cross-product calculation of x, y, z components of the normal map (see section 2.6.3, 1st-5th paragraphs).

In reference to claim 16, Kilgard and Rice disclose all of the claim limitations as applied to claim 1 above. Kilgard discloses the normal map being made up of range-compressed normal vectors representing the perturbation of object surfaces using 2D textures (see section 5.3, 1st paragraph, pg. 18). Kilgard also discloses the vectors derived using a cross-product calculation of x, y, z components of the normal map (see section 2.6.3, 1st-5th paragraphs). Rice discloses utilizing a computer to perform the rendering of graphical data, along with numerous memories/storage devices for storing data and also programming instructions (see column 3, lines 33-53 and Figure 4).

In reference to claims 17 and 18, Kilgard and Rice disclose all of the claim limitations as applied to claim 1 above. Kilgard further discloses the use of register combiners for calculating diffuse and ambient lighting components mixed with normal map texture data (see pg. 20, starting at 4th paragraph- item #7).

In reference to claims 19 and 40, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Although Rice discloses displaying and analyzing geophysical data, neither Kilgard nor Rice explicitly disclose the attributes being of medical data type. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the techniques of Kilgard to operate upon medical data instead of the geophysical data of Rice. Applicant has not disclosed that explicitly operating upon medical data provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with the geophysical data of Rice because the exact type of data utilized does not provide for an immediate criticality to the invention at hand. Even further support for such an interpretation can be found in Applicant's specification (see "Background of the Invention") wherein Applicant discloses that one possible way to utilize the invention would be geared towards the medical field while another would be geared towards the earth sciences field. Therefore, it would have been obvious to one of ordinary skill in this art to modify Kilgard to obtain the invention as specified in claims 19 and 40.

In reference to claims 20 and 41, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Rice discloses interactively displaying and analyzing geophysical data (see column 1, lines 7-11).

In reference to claims 21 and 42, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Kilgard discloses utilizing a constant color as the ambient illumination value (see #2 of pg. 20 and Figure 10, "Constant 0" & "Constant 1" input registers).

In reference to claims 22 and 43, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Kilgard further discloses calculating a specular lighting component from a tangent space perturbed normal map and then register combining the component with other lighting components from previous combining stages and the texture attributes provided from within the normal map (see section 5.5, pgs. 21-22).

2. Claims 23 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kilgard, "A Practical and Robust Bump-mapping Techniques for Today's GPUs," (July 5, 2000, pp. 1-39, NVIDIA Corp.), Rice (U.S. Patent 4,467,461) and further in view of Parghi et al. (U.S. Patent 6,396,495 B1).

In reference to claims 23 and 44, Kilgard and Rice disclose all of the claim limitations as applied to claims 1 and 27 respectively above. Neither Kilgard nor Rice explicitly disclose applying an imaginary light source to the image however Parghi et al. does. Parghi et al. discloses synthesizing image data in a virtual set using a virtual light source which is interactively repositioned relative to a line of sight of the image (see columns 5-6, lines 11-15 and Figure 6). Note, in reference to Figure 6, after the lighting is rearranged, process flows back up to repeat the calibration of the light sources, the loading of image and production of output data (see Figure 6, #605-609). Such flow would be similar when combining Parghi et al. to Kilgard and Rice. It would have been obvious to one of ordinary skill in the art at the time the

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invention was made to implement the lighting techniques of Parghi et al. with the analyzing and displaying of geophysical data attributes of Rice with the computer graphics bump-mapping techniques of Kilgard in order to provide a virtual reality representation of geophysical data, producing lighting effects which further improve the overall look and feel of the virtual representation (see column 1, lines 34-43 of Parghi et al.).

Response to Arguments

3. Applicant's arguments, see page 2 of Applicant's Remarks, filed 08/03/06, with respect to the objection of the specification have been fully considered and are persuasive. The objection of the specification has been withdrawn since the abstract has been corrected for.

4. Applicant's arguments filed 08/03/06 have been fully considered but they are not persuasive.

In reference to claims 1, 24, 25, 27, 45 and 46, Applicant argues that there is no motivation to combine Kilgard and Rice (see pages 3-4 of Applicant's Remarks). In response to Applicant's argument that there is no suggestion to combine the references, the Examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Kilgard is directed to bump-mapping techniques, rendering objects represented by polygonal models (see abstract, pg. 1 and section 5.1, 1st paragraph, pg. 17). Rice is directed to

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interactively displaying and analyzing geophysical data (see column 1, lines 7-11). Both references deal with simulations of surfaces and both Kilgard and Rice discuss techniques for displaying such surfaces. The Office has also previously indicated that Kilgard's techniques of bump-mapping are often associated with the displaying of geographic data (i.e. surface data) which Rice is clearly directed towards (see abstract of Rice). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the selecting, analyzing and displaying of geophysical data attributes of Rice with the computer graphics bump-mapping techniques of Kilgard in order to convey multiple pieces of information to the user in a single display screen by combining different attributes of surface data together, represented graphically using different effects, therefore creating an increase in yielded information to a user (see column 1, lines 47-54 of Rice). Further, Applicant specifically argues that there is no motivation to combine the techniques applied to video games in Kilgard with the geophysical data attributes of Rice. The Office disagrees with such statement since video game technology is constantly gaining on the visual display of realism and therefore, applying "real life" attributes of geophysical data of Rice to "video game" techniques of Kilgard is and has been, greatly desired in order to provide the greatest sense of realism for a video game user. Therefore, the Office maintains its rejection based upon Kilgard and Rice.

Further, Applicant argues that the combination of Kilgard and Rice would render both inoperable (see page 5 of Applicant's Remarks). The Office disagrees with such statement and contends Applicant's Remarks regarding the "user adjustment" of parameters in Rice as opposed to the realism sought in Kilgard. The mere fact that Rice teaches user adjustment of parameters does not render Kilgard inoperable and instead solely provides an option for a user operator to

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“tweak” settings of the display/system. It does not automatically negate or nullify the calculations in Kilgard but instead provides an option to customize the system in view of the user operator’s desired effects. Surely, such theory is present in many computer programs today where user operators have the ability to tweak or customize settings to their liking, for example, in virtual reality system whereby realistic data (i.e. environments- walls, flooring etc) is combined with user customized data (i.e. avatars) to produce a system of pseudo reality. Therefore, the Office maintains its previous rejection.

Also, Applicant argues that neither Kilgard nor Rice teach, “combining an ambient lighting component with the diffuse lighting component” and “at least one of the first and second attributes,” (see pages 5-6 of Applicant’s Remarks). The Office disagrees and points to the previous rejection (above). As stated above, Kilgard discloses calculating bump-mapped ambient illumination based upon an equation that utilizes a normalized vector (N') (see section 2.4, 2.4.1, pgs. 4-5). Kilgard lastly discloses blending both the ambient illumination component and a diffuse illumination component to form an object’s decal (see section 5.4, pg. 21, 2nd full paragraph and Figure 14). Further, the Office has interpreted that an “attribute” is represented in the texture data of Kilgard (see above rejection). Therefore, Kilgard does teach, “combining an ambient lighting component with the diffuse lighting component” and “at least one of the first and second attributes,” since the textures of Kilgard inherently provide some sort of “attribute,” as interpreted by the Office. Therefore, the Office maintains its current rejection based upon Kilgard and Rice.

In reference to claims 2-4 and 28-30, Applicant argues that Rice fails to teach combining attributes to form a first attribute, second attribute, or hybrid attribute (see pages 6-7 of

Applicant's Remarks). The Office disagrees and points to the previous rejection (above). As stated above, Rice discloses selecting parametric attributes of geophysical data, e.g. seismic data, exploration and delineation ore body data and the like, to exhibit the selected data property in variable pixel coverage and intensity on a display (see column 1, lines 35-47). Rice particularly discloses the selected attributes ranging from amplitude, frequency, envelope (energy), phase, instantaneous velocity, etc. (see column 3, lines 14-23). Note, in lines 14-23 of column 3 of Rice, multiple attributes are selected for output to display and therefore inherently, first and second attributes are selected from multiple attributes. As seen in column 3 of Rice, multiple attributes are selected and since claims 2-4 and 28-30 depend from independent claims 1 and 27, wherein the attributes are claimed as being "selected," the Office interprets that since multiple attributes of Rice are selected, these attributes inherently form combinations of one another for each variation of the selection performed by the user. Therefore, the Office maintains its current rejection based upon Kilgard and Rice.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Antonio Caschera whose telephone number is (571) 272-7781. The examiner can normally be reached Monday-Thursday and alternate Fridays between 7:00 AM and 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kee Tung, can be reached at (571) 272-7794.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

571-273-8300 (Central Fax)

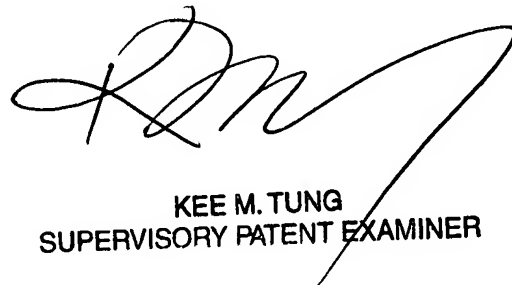
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (571) 272-2600.

aac



10/05/06

PATENT EXAMINER



KEE M. TUNG
SUPERVISORY PATENT EXAMINER